Notice of Allowability	Application No.	Applicant(s)	
	10/771,249	CHEN ET AL.	
	Examiner	Art Unit	
	Anh-Vu H. Ly	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment after final dated October 13, 2005*.

2. ☒ The allowed claim(s) is/are *1-5, 7-13, 15-21, 23-29, 31-32 renumbered as 1-28 respectively*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Matthew B. Dernier on November 03, 2005.

The application has been amended as follows:

In The Claims

1. (Currently Amended) A method, comprising:

(a) transforming a received orthogonal frequency division multiplexed (OFDM) signal from a transmission channel into the frequency domain, the OFDM signal having been subject to a clipping function prior to transmission in order to reduce the peak-to-average power ratio (PAPR);

(b) recovering data symbols from the transformed OFDM signal, which include clipping noise;

(c) subjecting the data symbols to substantially the same clipping function to which the OFDM signal had been subject to prior to transmission to produce clipped data symbols;

(d) attenuating the data symbols;

(e) subtracting the attenuated data symbols from the clipped data symbols to estimate the clipping noise in the frequency domain based on the data symbols; and

(f) subtracting the estimated clipping noise from the transformed OFDM signal.

7. (Currently Amended) The method of claim [6] 1, further comprising: multiplying the estimated clipping noise over each sub-carrier with complex channel gains, prior to subtracting the estimated clipping noise from the transformed OFDM signal.

9. (Currently Amended) An apparatus, comprising:

a receiver operable to receive an orthogonal frequency division multiplexed (OFDM) signal from a transmission channel, the OFDM signal having been subject to a clipping function prior to transmission in order to reduce the peak-to-average power ratio (PAPR);

a frequency transform unit operable to transform the OFDM signal to the frequency domain;

a decoding unit operable to recover data symbols from the frequency domain OFDM signal, which include clipping noise;

a noise estimator operable to estimate the clipping noise in the frequency domain based on the data symbols to produce clipped data symbols;

an attenuator circuit operable to attenuate the data symbols;

a first difference circuit operable to subtract the attenuated data symbols from the clipped data symbols to estimate the clipping noise in the frequency domain based on the data symbols; and

a second difference circuit operable to subtract the estimated clipping noise from the transformed OFDM signal.

15. (Currently Amended) The apparatus of claim [14] 9, further comprising a processing circuit operable to multiply the estimated clipping noise over each sub-carrier with complex channel gains, prior to subtracting the estimated clipping noise from the transformed OFDM signal.

17. (Currently Amended) An apparatus including a processor operating under the control of one or more software programs that cause the processor to carry out actions, comprising:

(a) transforming a received orthogonal frequency division multiplexed (OFDM) signal from a transmission channel into the frequency domain, the OFDM signal having been subject to a clipping function prior to transmission in order to reduce the peak-to-average power ratio (PAPR);

(b) recovering data symbols from the transformed OFDM signal, which include clipping noise;

(c) subjecting the data symbols to substantially the same clipping function to which the OFDM signal had been subject to prior to transmission to produce clipped data symbols;

(d) attenuating the data symbols;

(e) subtracting the attenuated data symbols from the clipped data symbols to estimate the clipping noise in the frequency domain based on the data symbols; and

(f) subtracting the estimated clipping noise from the transformed OFDM signal.

23. (Currently Amended) The apparatus of claim [22] 17, further comprising: multiplying the estimated clipping noise over each sub-carrier with complex channel gains, prior to subtracting the estimated clipping noise from the transformed OFDM signal.

25. (Currently Amended) A storage medium containing one or more software programs that are operable to cause a processor executing the one or more software programs to carry out actions, comprising:

(a) transforming a received orthogonal frequency division multiplexed (OFDM) signal from a transmission channel into the frequency domain, the OFDM signal having been subject to a clipping function prior to transmission in order to reduce the peak-to-average power ratio (PAPR);

(b) recovering data symbols from the transformed OFDM signal, which include clipping noise;

(c) subjecting the data symbols to substantially the same clipping function to which the OFDM signal had been subject to prior to transmission to produce clipped data symbols;

(d) attenuating the data symbols;

(e) subtracting the attenuated data symbols from the clipped data symbols to estimate the clipping noise in the frequency domain based on the data symbols; and

(f) subtracting the estimated clipping noise from the transformed OFDM signal.

31. (Currently Amended) The apparatus of claim [30] 25, further comprising: multiplying the estimated clipping noise over each sub-carrier with complex channel gains, prior to subtracting the estimated clipping noise from the transformed OFDM signal.

Allowable Subject Matter

2. Claims 1-5, 7-13, 15-21, 23-29, and 31-32 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art does not teach or fairly suggest subtracting the attenuated data symbols from the clipped data symbols to estimate the clipping noise in the frequency domain and subtracting the estimated clipping noise from the transformed OFDM signal, as specified in independent claims 1, 9, 17, and 25.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wang et al (US Pub 2002/0168016 A1) discloses method and apparatus for reducing PAPR in a multi-carrier modulation communication system.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh-Vu H. Ly whose telephone number is 571-272-3175. The examiner can normally be reached on Monday-Friday 7:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

avl

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11/4/05